
Space Weather Forecast

Issued on Friday, 13 September 2024 at 12:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: G1-G2 Minor to Moderate storms with coronal mass ejection arrival forecast to occur overnight day 1-2 (13-14 Sep). Moderate to High Solar Activity expected. Chance of visible aurora for northern parts of the UK.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with the strongest Moderate flare from a sunspot region that is now over the southwest limb. This was also the likely source of an extended period where the background X-ray observation rose above the Moderate flare level, lasting 12/2140-13/0936 UTC, with a relatively wide and bright coronal mass ejection (CME) also observed from the west limb. Other frequent Moderate level flares were also observed. The other region of interest is a newly numbered region that recently rotated onto the southeast limb. While modestly sized, this has some apparent complexity, although it remains hard to assess due to its near limb location. The region in the northwest disc has lost some complexity, with all other regions small and simpler.

The broad CME from the southwest, along with one observed off the northwest, have been assessed as missing Earth. A likely eruptive event was also observed from near the northwest sunspot at 13/0900 UTC. However the size of any associated flare was obscured by the on limb activity, and it remains to be seen if any CME occurred.

Solar Wind / Geomagnetic Activity: Ongoing CME effects continued at first due to the arrival on Thursday morning (12 Sep). Solar winds observed rose from slightly elevated at 500km/s to be briefly strong at around 600 km/s around 12/1800 UTC before erratically easing to be slightly elevated at 450km/s by the end of the period. Interplanetary Magnetic Field (IMF) was initially Strong then eased from 12/1900 UTC, gradually declining to be Weak by the end of the period. The north-south component initially reached a Strong southward orientation at 12/1305 UTC before rotating to a Strong northward at 12/1546 UTC. Then rotated to be persistently Southward, initially a little weaker than before, but still Strong, before easing back to being Weak to Moderate from 12/2000 UTC. Minimum before this period reached around -9nT. Phi angle was positive throughout (away from the Sun). Geomagnetic activity was G2-G3 Moderate to Strong storm 12/1200-2100UTC, then eased to G1/Minor storm 12/2100-13/0900 UTC, before easing further. Aurora was reported across the UK during the evening of 12 Sep.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was steady at near background.

Four-Day Space Weather Forecast Summary

Solar Activity: High to moderate activity expected with Moderate class flares expected and a chance of further Strong (X-class) flares, although this risk decreasing later in the period as the southwest regions rotate further onto the far-side.

Solar Wind / Geomagnetic Activity: Current CME influence is expected to continue easing through today (13 Sep), before a further arrival is anticipated. This is forecast to arrive either very late today, but more likely early on day 2 (14 Sep). Fast winds could potentially arrive day 3 (15 Sep) from the coronal hole in the north disc before a further enhancement is possible from

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

the coronal hole in the south disc. Unsettled to G1/Minor storm conditions will soon ease to Quiet to Active on day 1 (13 Sep), but likely followed by a further enhancement to Active to G1 Minor Storms with isolated G2 Moderate storms possible, due to the CME arrival. These most likely early on day 2 (14 Sep), before easing back to mainly Quiet to Unsettled by day 3 (15 Sep). Coronal hole influences may further increase activity for a time, to Unsettled to Active later day 3 into day 4 (15-16 Sep), and then Active to G1 Minor Storm day 4 into day 5 (16-17 Sep). Visible aurora is less likely than on the previous night, but still possible across the north of the UK, most likely early hours of Saturday.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has a chance to rise, mainly given any further strong flares and eruption from the southwest disc. This brings a chance of exceeding the S1 Minor Radiation Storm level, although this risk recedes later in the period as these regions move further onto the farside.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	80	70	5	20
Strong	G3	Yes	5	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	80	75	70	70
Very Active	R3 to R5 X	No	25	20	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	25	25	20	10
Very Active	≥ S3 *	No	5	5	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						